

CLAIMS

What is claimed is:

- 1 1. A method, comprising:
 - 2 identifying data to be added to a trie;
 - 3 separating the data into portions having sizes based, at least in part, on sizes
 - 4 related to trie blocks in the trie;
 - 5 indicating in a trie entry of a first trie block, wherein a first portion of the data
 - 6 identifies the trie entry, that a second portion of the data is stored in a pruned-trie entry;
 - 7 storing the second portion of the data in the pruned-trie entry; and
 - 8 indicating in the pruned-trie entry the position the second portion of the data
 - 9 occupies relative to other portions of the data.

- 1 2. The method of claim 1, further comprising:
 - 2 indicating in the trie entry of the first trie block a location of a second trie block;
 - 3 and
 - 4 indicating, in a trie entry of the second trie block, a location of additional data
 - 5 associated with the data, wherein a third portion of the data identifies the trie entry in the
 - 6 second trie block.

- 1 3. The method of claim 1, wherein the pruned-trie entry is located in the first
- 2 trie block.

1 4. The method of claim 1, wherein indicating that the second portion of the
2 data is stored in the pruned-trie entry of the first trie block comprises storing the second
3 portion in the trie entry of the first trie block.

1 5. The method of claim 1, wherein the pruned-trie entry is located in the
2 second trie block.

1 6. The method of claim 5, wherein indicating that the second portion is
2 stored in the pruned-trie entry comprises setting a bit to indicate that the second portion is
3 stored in the pruned-trie entry.

1 7. The method of claim 5, wherein indicating that the second portion is
2 stored in the pruned-trie entry comprises setting a pointer to point to the pruned-trie
3 entry.

1 8. The method of claim 2, wherein the data comprises a prefix.

1 9. The method of claim 8, wherein the additional data comprises a next hop
2 address.

1 10. The method of claim 1, wherein the sizes related to the trie block comprise
2 the sizes of the first trie block, the second trie block and the pruned-trie entry.

1 11. The method of claim 1, wherein the first portion comprises a root portion
2 and the second portion comprises one or more portions following the root portion.

4 12. The method of claim 1, wherein the first portion comprises a non-root
5 portion and the second portion comprises one or more portions following the non-root
6 portion.

1 13. The method of claim 1, wherein indicating the position of the second
2 portion comprises adding to the pruned-trie entry an indication of the position of the
3 second portion.

1 14. The method of claim 13, wherein the indication of the position comprises
2 a range of bit positions.

1 15. The method of claim 13, wherein the indication of the position comprises
2 a mask that indicates bit positions.

1 16. A method, comprising:
2 identifying in a data packet an address of a network device;
3 locating, in a first trie block of a trie data structure, a first portion of a prefix that
4 matches a corresponding first portion of the address, wherein the first portion of the
5 prefix identifies a trie entry of a first trie block;

6 determining whether the trie entry of the first trie block indicates that a trie-entry
7 portion of the prefix is stored in a pruned-trie entry;
8 if the first trie entry indicates that the trie-entry portion of the prefix is stored in
9 the pruned-trie entry:
10 determining from the trie entry of the first trie block a location of the
11 pruned-trie entry;
12 determining whether the trie-entry portion of the prefix matches a second
13 portion of the address that occupies the same position in the address as the trie-
14 entry portion occupies in the prefix;
15 determining, if the trie-entry portion matches the second portion of the
16 address, whether a trie entry of a second trie block indicates a location of a next
17 hop address, wherein the trie entry of the second trie block is identified by a
18 second portion of the prefix matching a third portion of the address; and
19 determining the next hop address from the trie entry of the second trie
20 block, if the trie entry of the second trie block indicates the location of the next
21 hop address.

1 17. The method of claim 16, wherein the address comprises a destination
2 address.

1 18. The method of claim 16, wherein the pruned-trie entry is located in the
2 first trie block.

1 19. The method of claim 18, wherein determining whether the trie entry of the
2 first trie block indicates that the trie-entry portion is stored in the pruned-trie entry
3 comprises determining whether the trie-entry portion is stored in trie entry of the first trie
4 block.

1 20. The method of claim 16, wherein the pruned-trie entry is located in the
2 second trie block.

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1 21. The method of claim 20, wherein determining whether the trie entry of the
2 first trie block indicates that the trie-entry portion is stored in the pruned-trie entry
3 comprises determining whether a bit is set to indicate that the trie-entry portion is stored
4 in the pruned-trie entry.

1 22. The method of claim 20, wherein determining whether the trie entry of the
2 first trie block indicates that the trie-entry portion is stored in the pruned-trie entry
3 comprises determining whether a pointer is set to point to the pruned-trie entry of the
4 second trie block.

1 23. The method of claim 16, further comprising determining from the pruned-
2 trie entry the position the trie-entry portion occupies in the prefix.

1 24. The method of claim 23, wherein determining the position the trie-entry
2 portion occupies in the prefix comprises examining an indication of a range of bit
3 positions of the trie-entry portion in the prefix.

1 25. The method of claim 23, wherein determining the position the trie-entry
2 portion occupies in the prefix comprises examining a mask indicating bit positions of the
3 trie-entry portion in the prefix.

1 26. The method of claim 16, further comprising identifying, if the trie-entry
2 portion fails to match the second portion of the address, the next hop address indicated by
3 the trie entry of the first trie block.

1 27. The method of claim 16, further comprising:
2 determining, if the trie entry of the first trie block fails to indicate that the pruned-
3 trie entry includes the trie-entry portion, whether a different trie entry of the second trie
4 block indicates a next hop address, wherein a third portion of the prefix that matches the
5 second portion of the address identifies the different trie entry;

6 identifying, if the different trie entry of the second trie block indicates the next
7 hop address, the next hop address indicated by the different trie entry of the second trie
8 block; and

9 identifying, if the different trie entry of the second trie block fails to indicate the
10 next hop address, the next hop address indicated by the trie entry of the first trie block.

1 28. An article of manufacture comprising:
2 a machine-accessible medium including thereon sequences of instructions that,
3 when executed, cause an electronic system to:
4 identify data to be added to a trie;
5 separate the data into portions having sizes based, at least in part, on sizes related
6 to trie blocks in the trie;
7 indicate in a trie entry of a first trie block, wherein a first portion of the data
8 identifies the trie entry, that a second portion of the data is stored in a pruned-trie entry;
9 store the second portion of the data in the pruned-trie entry; and
10 indicate in the pruned-trie entry the position the second portion occupies relative
11 to other portions of the data.

1 29. The article of manufacture of claim 28, further comprising sequences of
2 instructions that, when executed, cause the electronic system to:
3 indicate in the trie entry of the first trie block a location of a second trie block;
4 and
5 indicate, in a trie entry of the second trie block, a location of additional data
6 associated with the data, wherein a third portion of the data identifies the trie entry in the
7 second trie block.

1 30. The article of manufacture of claim 29, wherein the data comprises a
2 prefix.

1 31. The article of manufacture of claim 30, wherein the additional data
2 comprises a next hop address.

1 32. An article of manufacture comprising:
2 a machine-accessible medium including thereon sequences of instructions that,
3 when executed, cause an electronic system to:
4 identify in a data packet an address of a network device;
5 locate, in a first trie block of a trie data structure, a first portion of a prefix that
6 matches a corresponding first portion of the address, wherein the first portion of the
7 prefix identifies a trie entry of a first trie block;
8 determine whether the trie entry of the first trie block indicates that a trie-entry
9 portion of the prefix is stored in a pruned-trie entry;
10 if the first trie entry indicates that the trie-entry portion of the prefix is stored in
11 the pruned-trie entry:
12 determine from the trie entry of the first trie block a location of the
13 pruned-trie entry;
14 determine whether the trie-entry portion of the prefix matches a second
15 portion of the address that occupies the same position in the address as the trie-
16 entry portion occupies in the prefix;
17 determine, if the trie-entry portion matches the second portion of the
18 address, whether a trie entry of a second trie block indicates a location of a next
19 hop address, wherein the trie entry of the second trie block is identified by a
20 second portion of the prefix matching a third portion of the address; and

21 determine the next hop address from the trie entry of the second trie block,
22 if the trie entry of the second trie block indicates the location of the next hop
23 address.

1 33. The article of manufacture of claim 32, wherein the address comprises a
2 destination address.

1 34. The article of manufacture of claim 32, wherein the machine-accessible
2 medium further comprises sequences of instructions that, when executed, cause the
3 electronic system to determine from the pruned-trie entry the position the trie-entry
4 portion occupies in the prefix.

1 35. A system, comprising:
2 a processor;
3 a network interface coupled with the processor; and
4 an article of manufacture comprising a machine-accessible medium including
5 thereon sequences of instructions that, when executed, cause an electronic system to:
6 identify data to be added to a trie;
7 separate the data into portions having sizes based, at least in part, on sizes related
8 to trie blocks in the trie;
9 indicate in a trie entry of a first trie block, wherein a first portion of the data
10 identifies the trie entry, that a second portion of the data is stored in a pruned-trie entry;
11 store the second portion of the data in the pruned-trie entry; and

12 indicate in the pruned-trie entry the position the second portion occupies relative
13 to other portions of the data.

1 36. The system of claim 35, further comprising sequences of instructions that,
2 when executed, cause the electronic system to:
3 indicate in the trie entry of the first trie block a location of a second trie block;
4 and
5 indicate, in a trie entry of the second trie block, a location of additional data
6 associated with the data, wherein a third portion of the data identifies the trie entry in the
7 second trie block.

1 37. The system of claim 36, wherein the data comprises a prefix.

1 38. A system, comprising:
2 a processor;
3 a network interface coupled with the processor; and
4 an article of manufacture comprising a machine-accessible medium including
5 thereon sequences of instructions that, when executed, cause an electronic system to:
6 identify in a data packet an address of a network device;
7 locate, in a first trie block of a trie data structure, a first portion of a prefix that
8 matches a corresponding first portion of the address, wherein the first portion of the
9 prefix identifies a trie entry of a first trie block;
10 determine whether the trie entry of the first trie block indicates that a trie-entry
11 portion of the prefix is stored in a pruned-trie entry;

12 if the first trie entry indicates that the trie-entry portion of the prefix is stored in
13 the pruned-trie entry:
14 determine from the trie entry of the first trie block a location of the
15 pruned-trie entry;
16 determine whether the trie-entry portion of the prefix matches a second
17 portion of the address that occupies the same position in the address as the trie-
18 entry portion occupies in the prefix;
19 determine, if the trie-entry portion matches the second portion of the
20 address, whether a trie entry of a second trie block indicates a location of a next
21 hop address, wherein the trie entry of the second trie block is identified by a
22 second portion of the prefix matching a third portion of the address; and
23 determine the next hop address from the trie entry of the second trie block, if the
24 trie entry of the second trie block indicates the location of the next hop address.

1 39. The system of claim 38, wherein the address comprises a destination
2 address.

1 40. The system of claim 38, wherein the machine-accessible medium further
2 comprises sequences of instructions that, when executed, cause the electronic system to
3 determine from the pruned-trie entry the position the trie-entry portion occupies in the
4 prefix.